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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,116	03/16/2004	Jefferson G. Shingleton	PWRL 1030-3	3332
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/802,116

**Applicant(s)**

SHINGLETON, JEFFERSON G.

**Examiner**

ASHA HALL

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date May 7, 2008
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Shugar et al. (Commercialization of a Value—Engineering Photovoltaic Tracking System, IEEE 25th PVSC Proceedings May 13-17, 1996,p.1537-1540).

With respect to claim 1, Shugar et al. discloses a tracking solar collector (Figure 3) of the type comprising a series of supports oriented on a generally north-south axis/two axis tracker (p.1538 column 1; paragraph 1, and depicted Figure 3.4 kWac PolarTracker Photograph at APS Star Facility); a torsion tube having a torsion tube axis rotatably mounted to the supports to permit rotation of the torsion tube about the torsion tube axis (Design Features p.1539 and Figure p.1537); a torsion tube rotator operably coupled to the torsion tube so to rotate the torsion tube between morning, noontime, and evening angular orientations (Performance Results p. 1539) and photovoltaic flat panels, each having a center of gravity (p.1538 column 1; paragraph 1, and depicted Figure 3.4 kWac PolarTracker Photograph at APS Star Facility), the

improvement comprising mounting structure securing the solar panels to the torsion tube at a chosen angle (20 and 45 degrees) to the torsion tube axis (Design Features p.1539 and Figure p.1537). Shugar et al. discloses each of the solar panels is located entirely vertically above the torsion tube axis when the torsion tube is at the noontime angular orientation (p.1538 column 1; paragraph 1, and depicted Figure 3.4 kWac PolarTracker Photograph at APS Star Facility).

In regard to claim 3, Shugar et al. discloses the solar collector according to claim 1 wherein the mounting structure further comprises: first and second plates/solar panels (p.1538 column 1; paragraph 1, and depicted Figure 3.4 kWac PolarTracker Photograph at APS Star Facility) having a generally triangular torsion tube portion(Multiple Point Foundations, p.1538), located on opposite sides of the torsion tube (p.1538 column 1; paragraph 1, and depicted Figure 3.4 kWac PolarTracker Photograph at APS Star Facility); an elongated, generally rectangular solar panel portion extending at an angle from the torsion tube portion (p.1538 column 1; paragraph 1, and depicted Figure 3.4 kWac PolarTracker Photograph at APS Star Facility); and fasteners extending through or around the torsion tube portions and the torsion tube (Maximum Availability Design, p. 1538).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4-7, 9-21 and 25-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shingleton (6,058,930) in view of

With respect to claim 4, Shingleton discloses a tracking solar collector assembly as shown in Figure 10 comprising: first and second solar collector (34) mounted to first and second Southside supports/lower support piers (36); the first tracking solar collector (34) comprising first and solar collector structure as shown in Figure 4A,B; first, second and third North side supports/lower support piers (36) (col.1; lines: 38-41); the Southside supports/lower support piers (36) and the North side supports/upper support piers (36) defining first and second generally parallel paths (Figure 10); As shown in Figure 10, Shingleton depicts the second support point of the second solar collector support structure/pier support (36) (Shingleton depicts several pier supports (36) under each row of solar panels (34) and a series of row arrangements(30) (col. 5; lines: 53-60)) is pivotally connected to and is supported by the second and third North side (the North side is interpreted as the top half of the row of arrangements (30)) supports/upper pier supports (36); and a tilting assembly comprising of: a drive element (42) secured to each solar collector support structure as shown in Figure 10 (col.3; lines: 12-15).

- Shingleton further discloses wherein first and second solar collector (34) mounted to each solar collector support structure (36) (col. 7; lines: 34-39); and the first support points of the first and second solar collector support structures pivotally connected to and supported by the first and second Southside supports/ lower pier supports (36), respectively (col.1; lines: 61-

64). Furthermore, as shown in Figure 10, the second support point (36) of the first solar collector support structure (36) is pivotally connected to and is supported by the first and second North side supports/upper pier supports (36) (col.1; lines: 61-64).

- Shingleton further discloses in Figure 10 a drive element coupler (42) operably coupling the drive elements (col.1; lines: 41-44), the drive elements and the drive element coupler creating a drive assembly (col.3; lines: 26-32); and a driver coupled to the drive assembly so that operation of the driver causes the drive elements move in unison thus causing the solar collector support structures and the solar collectors therewith to tilt in unison (col.3; lines: 16-22).
- Shingleton discloses the first and second paths are generally East-West paths (col.; lines: 30-31).

However, Shingleton fails to disclose that the second support point of the second solar collector support structure/pier support is pivotally connected to and is supported by the second and third North side supports/upper pier supports; and a tilting assembly comprising of: a drive element secured to each solar collector support structure.

Shugar et al. discloses a tilted polar axis photovoltaic panels (abstract and Figure on p.1537) and further discloses three legs support for per tracker of the solar panels (Multiple Point Foundation p. 1538) and tilting capability (Commercial Demonstration, p. 1539). Shugar et al. teaches that the three leg support offers

multiple point foundations and that each tracker was designed to operate independently with complete mechanical, electrical and control autonomy, with a separate inverter and drive system for each tracker (Maximum Availability Design, p. 1538). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a support structure pivotally connect and support by other supports as taught by Shugar et al. to the assembly of Shingleton in order to offer multiple point foundations and that each tracker was designed to operate independently with complete mechanical, electrical and control autonomy, with a separate inverter and drive system for each tracker.

In regard to claim 5, modified Shingleton discloses the assembly according to claim 4 above, wherein at least one tilt axis is at an angle to a horizontal line (Figure 4A).

With respect to claim 6, modified Shingleton discloses the assembly according to claim 5 above, wherein said angle is between about 15° to 30° (col.7; lines: 9-14) (Figure 7).

In regard to claim 7, modified Shingleton discloses the assembly according to claim 5, wherein said support element is a variable- length support element (64) as shown in Figure 3B and Figure 3C to permit said angle to be changed (col.4; lines: 21-24).

In regard to claim 9, modified Shingleton discloses the assembly according to claim 4, wherein the drive element/drive actuator (42) is secured to each solar collector

support structure at a point between the first and second support points/pier support (36) as shown in Figure 10 (col.7; lines: 34-38).

With respect to claim 10, modified Shingleton discloses the assembly according to claim 4, wherein a plurality of said solar collectors (34) are mounted to the solar collector support structures (36) (Figure 10).

In regard to claim 11, Shingleton discloses the assembly according to claim 10, wherein the solar collectors define an array (80) of solar collectors having generally parallel lateral sides (Figure 9).

With respect to claim 12, modified Shingleton discloses the assembly according to claim 4 wherein the solar collector comprises a PV module (col.1; lines: 12-15).

In regard to claim 13, modified Shingleton discloses the assembly according to claim 4, wherein the first and second Southside supports/lower pier supports (36) are generally vertically aligned with the tilt axes of the first and second solar collector support structures (36), respectively (Figure 10).

With respect to claim 14 and 15, modified Shingleton discloses the assembly according to claim 4, wherein the second North side support/upper support (36) is laterally midway and between the tilt axes of the first and second solar collector support structures as shown in Figure 10 (col.7; lines: 34-40).

For claims 16-21, Shingleton discloses the base/torsion arm (66) in Figure 3A to 3C, wherein the North/upper half of rows (50) of solar panels (54) are further disclosed in Figure 9A to 9C. In Figure 10, Shingleton shows the support/piers (36) underneath



the rows of solar panels, wherein each support point is interpreted as the point where the pier is in contact with the rows of the solar panels.

Thereby in regard to claim 16, modified Shingleton discloses the assembly according to claim 4, wherein the first, second and third North side supports each include a base securable to a support surface/torsion tube arm (66), each base laterally offset from the tilt axes (52) of the first and second solar collector support structures as shown in Figure 3B.

With respect to claim 17, modified Shingleton discloses the assembly according to claim 16, wherein the base of the second North side support/upper support is laterally midway and between the tilt axes of the first and second solar collector support structures (col.7; lines: 34-40).

In regard to claim 18, Shingleton discloses the assembly according to claim 4, wherein each North side support/upper support comprises a base, mountable to a support surface, and at least one support element connecting the base to a second support point (Figure 3B).

With respect to claims 19 and 20, Shingleton discloses the assembly according to claim 18 wherein the base of the second North side support/upper pier supports (36) is positioned generally equidistant from the second support points/pier supports of the first and second solar collector support structures (Figure 10). Shingleton further wherein said support element is a fixed-length support element as shown in Figure 10.

In regard to claim 21, modified Shingleton discloses comprising a fourth North side support/upper pier supports (36) as according to claim 4 above, and wherein: the

second support point (each support point is interpreted as the point where the pier is in contact with the rows of the solar panels- col.1; lines: 38-41) of the first solar collector support structure is pivotally connected (42) to and supported by the first, second and third North side supports/upper pier supports (36) as shown in Figure 10. Shingleton further discloses that the second support point of the second solar collector support structure/support piers (36) is pivotally connected (42) (col.2; lines: 38-40) to and supported by the second, third and fourth North side supports/upper pier supports (36) as shown in Figure 10 (col.1; lines: 61-65 and col.6; lines: 16-22). Furthermore, Shingleton discloses that the row of solar panels is mounted on a torsion tube that is support in the bearing members atop one or more piers, each pier having a footing supported in the earth (col.6; lines: 16-18).

In regard to claim 25, modified Shingleton discloses the assembly according to claim 4 above, wherein the solar collector support structure comprises a torque tube extending along the tilt axis (col. 2; lines: 3-11).

With respect to claim 26, modified Shingleton discloses the assembly according to claim 25 above, wherein the solar collector support structure comprises module rails/ torque arms (66) secured to the torque tube (56) and extending laterally from the torque tube as shown in Figure 3A to 3C.

In regard to claims 27-31, modified Shingleton discloses a tracking solar collector assembly comprising a tracking solar collector assembly according to claim 4 mounted to a support surface/ mounting on a footing supported by the earth/ground/roof/parking ramp/artificial surface (e.g. reservoir cover) (col.3; lines: 23-26 and col.8; lines: 41-45).

Shingleton further discloses that the support surface/ground is an uneven terrain (gravel) (col.3; lines: 35-37).

With respect to claim 32, modified Shingleton discloses the assembly according to claim 4 wherein a plurality of solar collectors/panels are mounted to the solar collector support structures (col.3; lines: 11-15), said plurality of solar collectors defining a gap between the solar collectors as shown in Figure 9A-9C, the gap extending perpendicular to the tilt axis/drive actuator (42).

In regard to claim 33, modified Shingleton discloses the assembly according to claim 32, wherein at least one of the North side/upper supports comprises laterally extending support elements extending generally perpendicular to the tilt axes (42) and aligned with the gap so that tilting the solar collector support structures as shown in Figure 10, and the solar collectors/panels causes the laterally extending support elements to pass through the gap (Figure 9A to 9C).

6. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being obvious over Shingleton (6,058,930) as applied to claim 21 above, and in further view of Osterwisch (5,758,938).

With regard to claims 22-24, Shingleton discloses the assembly according to claim 21 above, wherein the second support point (each support point is interpreted as the point where the pier is in contact with the rows of the solar panels- col.1; lines: 38-41) of the first solar collector support structure is connected to the first and third North side supports/pier support (36), but fails to disclose that the support structure is vertically aligned by tension or compression struts comprised as a post.

Osterwisch discloses a solar concentrator panel support assembly (Figure 1) and further discloses an actuator member (32), which acts as a strut or a brace/cable/posts (vertically aligned) that assists the mechanism in resisting compression and tension forces as shown in Figure 1 (col.2; lines: 39-47). Osterwisch teaches that this is important because commercial solar concentrators and associated equipment are often very large and gravitational and wind related forces that place substantial forces on the solar concentrator drive mechanisms (col.2; lines: 39-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the struts of Osterwisch et al. to the photovoltaic panel support assembly of Shingleton in order to compensate for very large and gravitational and wind related forces that place substantial forces on the solar concentrator drive mechanisms.

7. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being obvious over Shingleton (6,058,930) as applied to claim 33 above, and in further view of Laing et al. (5,445,177).

With regard to claims 34-36, Shingleton discloses the assembly according to 33 above, wherein the second support point (each support point is interpreted as the point where the pier is in contact with the rows of the solar panels- col.1; lines: 38-41) of the first solar collector support structure is connected to the first and third North side supports/upper pier support (36), and wires/flexible cables may be run inside of the tubular members (col.6; lines: 45-48), but fails to disclose that the support structure or tubular members are comprised of struts/rods.

Laing et al. discloses a photovoltaic panel support assembly (Figure 3) and further discloses supports such as struts (34) and cables (34a) as shown in Figure 3 (col.4; lines: 48-49) and rods-shaped units (col.6; lines: 35-37), wherein strut (44) and cables as shown in Figure 4 are flexed around an axis perpendicular to the focal line (19) of the sun rays not to obstruct the sun rays (col. 6; lines: 3-6) which is connected to the base member (col.4; lines: 7-11). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the support struts/ flexible cables/rods of Laing et al. to the photovoltaic panel support assembly of Shingleton in order to around an axis perpendicular to the focal line of the sun rays thereby not obstructing the sun rays.

### ***Response to Arguments***

#### **Claim Rejection under 35 U.S.C. 102(b)**

8. In regard to claims 1-7, Applicant's arguments filed May 8, 2008, with respect to the rejection(s) of claim(s) 1-7 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Shugar et al. as presented above.

In regard to claims 14 and 15, the Applicant argues that the second North side support/upper support (36) of Shingleton is not laterally midway between the first and second tilt axis but rather is aligned with the second tilt axis.

The Examiner respectfully disagrees. Shingleton discloses the second North side support/upper support (36) is laterally midway and between the tilt axes of the first and second solar collector support structures as shown in Figure 10 (col.7; lines: 34-40).

In regard to claims 16, 17, and 19, the Applicant argues that the pier 36 of Shingleton are not laterally offset but are position directly beneath the second tilt axis.

The Examiner respectfully disagrees. As shown in Figure 10, Shingleton depicts a plurality of piers/support post (36) laterally offset with respect to the center point, and directly underneath the rows of arrangements (30).

Claim Rejections under 35 U.S.C. 103(a)

9. With respect to claims 22-24, the Applicant argues that Shingleton fails to disclose or suggest that piers/support post (36) could be anything but pier type compression members as opposed to a combination of pier type compression member and tension members.

The Examiner agrees that Shingleton fails to disclose that the support structure is vertically aligned by tension or compression struts comprised as a post, but used Osterwisch to provide this feature.

Osterwisch discloses a solar concentrator panel support assembly (Figure 1) and further discloses an actuator member (32), which acts as a strut or a brace/cable/posts (vertically aligned) that assists the mechanism in resisting compression and tension

forces as shown in Figure 1 (col.2; lines: 39-47). Osterwisch teaches that this is important because commercial solar concentrators and associated equipment are often very large and gravitational and wind related forces that place substantial forces on the solar concentrator drive mechanisms (col.2; lines: 39-47). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the struts of Osterwisch et al. to the photovoltaic panel support assembly of Shingleton in order to compensate for very large and gravitational and wind related forces that place substantial forces on the solar concentrator drive mechanisms.

As to claims 33-36, the Applicant argues that with Shingleton, there are not laterally extending support elements aligned with any gap so that tilting does not cause the nonexistent laterally extending support elements to pass through the gap. The Examiner agrees that Shingleton fails to disclose that the support structure or tubular members are comprised of struts/rods, but the examiner used Laing to provide this feature.

Laing et al. discloses a photovoltaic panel support assembly (Figure 3) and further discloses supports such as struts (34) and cables (34a) as shown in Figure 3 (col.4; lines: 48-49) and rods-shaped units (col.6; lines: 35-37), wherein strut (44) and cables as shown in Figure 4 are flexed around an axis perpendicular to the focal line (19) of the sun rays not to obstruct the sun rays (col. 6; lines: 3-6) which is connected to the base member (col.4; lines: 7-11). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the support struts/ flexible cables/rods of Laing et al. to the photovoltaic panel support assembly of Shingleton in order to around

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an axis perpendicular to the focal line of the sun rays thereby not obstructing the sun rays.

***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ASHA HALL whose telephone number is (571)272-9812. The examiner can normally be reached on Monday-Thursday 8:30-7:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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AJH

/A. H./

Examiner, Art Unit 1795

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795

